

APPENDIX C

WEATHER EFFECTS ON ARMOR

Armor operations are influenced primarily by those weather elements that degrade trafficability and visibility. Although the effect may be more pronounced for armor operations, weather elements have generally similar types of impacts on other units. Listed below are weather effects for armor that are not contained in the WTDA tables.

BAROMETRIC PRESSURE. The weight of the air affects gunnery computations and ballistic performance.

CLOUDS AND SKY COVER. Low overcast clouds limit the effectiveness of aerial illumination devices. Overcast clouds tend to limit heating of inactive targets and lower target detection ranges for thermal sights. NVD are limited by clouds blocking natural light from the moon and stars. Close air support (CAS) and aerial resupply missions are degraded by low clouds.

HUMIDITY. Coupled with high temperatures, high humidity decreases crew effectiveness in closed vehicles.

ILLUMINATION. Best use of most NVD requires about a quarter (23 percent) of the moon, 30 degrees above the horizon, scattered clouds, and the sun more than 5 degrees below the horizon. Detailed products dealing with the use of E-O devices are available from the SWO.

PRECIPITATION. Rain and snow degrade trafficability and limit visibility. They also degrade target acquisition and NVD.

SURFACE WIND. Trajectory projections and first round hit capability affected by high crosswinds.

STATE-OF-THE-GROUND. Frozen ground improves mobility and significantly increases the time available to prepare fighting positions. Deep snow slows movement of tracked vehicles. Frozen ground and mud affects munitions, sensors, and indirect fire.

TEMPERATURE. Temperatures influence the type of lubricants to be used, engine warm-up periods, and sustained rates of fire for weapons. High temperatures decrease the time personnel can remain in vehicles. High temperatures cause gun tube droop.

shimmering, mirages, and vehicle exteriors to be too hot to touch. Extremely high temperatures increase water consumption. Low temperatures degrade the ballistics of main guns and require frequent starting of engines and may increase maintenance problems and possible detection by the enemy. Extremely low temperatures reduce personnel effectiveness and decrease the availability of water because of freezing. Temperatures changing from above to below freezing can freeze stationary tracks into the mud.

VISIBILITY. Visibility affects visual acquisition, degrades laser range finding and target acquisition systems.

WINDCHILL. Winds affect the apparent temperature in which soldiers must operate. The windchill table must be consulted to determine the actual effective temperature.

Table C-2. Weather effects from reduced visibility.

WEATHER VALUE (METERS)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT 100	Forward Observer (FO)		M-1 Tank	Speed
LT 200			LAW NVG (PVS-5) Infrared aiming light (PAQ-4)	
LT 400			NVS (PVS-2)	
LT 500	DRAGON		FO	
LT 600			NVS (PVS-4)	
LT 800	Tracked vehicle (day operation)			
LT 1,000	TOW		DRAGON DRAGON thermal sight (TAS-5) 106-mm recoilless rifle M-60 machine gun 7.62-mm coaxial machine gun	
LT 1,200			NVS (TVS-2 and TVS-5)	
LT 1,600	CAS	See app E	60-mm mortar (non-HE round) Tracked vehicle (day operation) .50-cal machine gun	
LT 2,000			NVS (TVS-4)	
LT 3,200			CAS M-60 main gun 25-mm chain gun M-1 main gun TOW thermal sight (UAS-12) Handheld thermal viewer (PAS-7) Thermal night observing device (UAS-11) 60-mm mortar (HE round)	See app E
LT 4,500			107-mm mortar	

Table C-3. Weather effects from surface wind.

WEATHER VALUE (KNOTS)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT 25			Incendiaries	
GT 7			GSR	Increased noise
GT 10			Chemical emplacement	Less effective
GT 13			Airborne DZ limit	Less effective
GT 15			Acoustic sensors	Less effective
GT 15 Cross-winds			TOW, DRAGON	Impacts tracking/ reduces range
GT 20	GSR	Increased noise	Communication antennas NOE operations	
GT 25			Personnel	
GT 30	Helicopter operations	May cancel mission See app E		
GT 40	Personnel Radar (PPS-5)	Antenna breaks		
GT 45	Acoustic sensors	Less effective		
GT 50	Communications antennas			

Table C-4. Weather effects from temperature.

WEATHER VALUE (°F/°C)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT -25/-32	TOW DRAGON Handheld thermal viewer (PAS-7) Dry cell battery Personnel	Only 20% effective	Generators M-1 Tank CFV, M3 Laser infrared observation set (GVS-5)	wo Arctic kit wo winter kit wo winter kit wo external power
LT -20/-28			NVS (PVS-4 and TVS-5) Maintenance Tanks, M-1, M-60	wo low temp adapter Five times longer Accuracy
LT 0/-18			Wheeled vehicles Dry cell battery	wo winter kit Only 40% effective
LT 20/-6			Thermal night observing device (UAS-11) Platoon early warning system (TRS-2) DRAGON	wo Arctic kit wo BA3090 battery wo low temp adapter
LT 32/0			NVG (PVS-5) Small arms and machine guns Personnel	wo Arctic kit Functions affected See app L for windchill
GT 85/29	Personnel	See app L	Dry cell battery	Will not hold charge
GT 125/52	All NVS Generators Laser infrared observation set (GVS-5) WP rounds	Operations deteriorate Operations deteriorate Operations deteriorate Special care for storage		

Table C-5. Weather effects from precipitation.

WEATHER CONDITION	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
Light rain or snow			M-1 Laser range finder Wheeled vehicles	Fake ranging returns
Moderate rain or snow	Wheeled vehicles		LOS communications Personnel movement Target acquisition GSR Equipment storage	
Heavy rain or snow	Personnel movement LOS communications Target acquisition			
Thunder- storm/ lightning			Ammunition storage Refueling Communications Equipment storage	Safety Interference
Light freezing rain			Personnel Wheeled vehicles	
Moderate freezing rain	Personnel Wheeled vehicles			
SNOW DEPTH (INCHES)				
GT 3			Personnel movement	
GT 6	Personnel movement		20-mm and 40-mm ammunition Wheeled vehicles	
GT 12	Wheeled vehicles			
GT 20			Tracked vehicles	
GT 30	Tracked vehicles			